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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/552,782

01/23/2006

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CU-4417 RJS

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EXAMINER

NEGIN, RUSSELL SCOTT

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/552,782	Applicant(s) KIIVERI ET AL.	
	Examiner RUSSELL S. NEGIN	Art Unit 1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 December 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/24/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election of Species B in the reply filed on 24 December 2008 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

However, since the prior art used in the instant Office action teaches all of the species of the Restriction requirement mailed on 29 October 2008, all of the species are rejoined. Consequently, no claims are withdrawn. Claims 1-26 are pending and examined in the instant Office action.

Comments

Claim 13 uses the abbreviation EM. Although this abbreviation is defined as "expectation maximisation" on page 14 of the specification, it is requested that applicant indicate what the abbreviation EM represents (i.e. the full term) in instant claim 13.

Information disclosure statement

The information disclosure statement filed on 24 August 2008 has been considered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "having a high probability density close to zero" in claims 1, 28, and 25-26 is a relative term which renders the claim indefinite. The term "having a high probability density close to zero" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not known as to both what constitutes a "high probability density" as opposed to a low probability density and how proximate is "close" to zero as opposed to distant from zero.

Claim 8 is indefinite because the equation listed is incomprehensible. A meaningful search cannot be performed on the claim as it stands because it is ambiguous as to what the equation signifies within the claim. It appears that the problem may be due to an error in transcription, as the claim is indicated as "original." As it is unclear whether the claim was intended to be amended, or whether there was a problem in transcription, faxing, or scanning the claims, the claim is not rejected herein for reciting new matter, but is rejected only for indefiniteness. Applicant is required to amend the claim if further examination is desired on instant claim 8.

Claims 9-11 are ambiguous because it is ambiguous as to what the coefficients and variables signify in the instant set of equations from the claimed limitations alone. Applicant is advised to define the variables and coefficients of the instant equations in the instant set of claims.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-13, 15, 17, and 18-26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-13, 15, 17, and 18-26 are drawn to a method and apparatus for identifying a subset of components of a system based in data obtained from the system using at least one training sample from the system.

As stated in MPEP 2106, section IV, if the claims are found to cover a judicial exception then the claims will be evaluated for providing a practical application of the judicial exception (*i.e.*, Law of Nature, Natural Phenomenon, or an Abstract Idea). This is in line with the recent decision in *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008). In the instant case, the claims are drawn to an abstract idea and therefore must be evaluated further for providing a practical application of the judicial exception. Two of the possible ways for a practical application to result are: (1) if the claimed invention physically transforms an article or physical object to a different state or thing (a physical transformation), or (2) if the claimed invention otherwise

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recites a practical application; e.g. the method produces a concrete, tangible, and useful result. In the instant case, a physical transformation of matter is not provided, as the instant claims merely provide steps of *in silico* information manipulation. Therefore, none of said steps result in a physical transformation of matter such that the whole of the claim is statutory.

As such, the claims must be further evaluated for providing the practical application. One way to do this is for the claim to produce a concrete, tangible and useful result. The focus is not on the steps taken to achieve a particular result, but rather the final result achieved by the claimed invention. The instant set of rejected method claims (claims 1-13, 22-23, and 26) do not recite a practical application because there is no real world application of the resulting data evident from the claim (i.e. it is not known as to what to do with the result of the instant claim when the subsets of the components of the system are identified.)

However, in addition to the facts set forth above that state that a claim must provide a practical application, the claim **must also meet** the machine-or-transformation test in order to be eligible under 35 USC 101 as statutory subject matter (*In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008)). In other words, the prohibition on patenting abstract ideas has two distinct aspects: (1) when an abstract concept has no claimed practical application, it is not patentable; (2) while an abstract concept **may have a practical application**, a claim reciting an algorithm or abstract idea can state statutory subject matter only if it is embodied in, operates on, transforms, or otherwise is tied to another class of statutory subject matter under 35 U.S.C. §101 (i.e. a machine,

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manufacture, or composition of matter). (*Gottschalk v. Benson*, 409 U.S. 63, 175 USPQ 673, 1972), as clarified in *In re Bilski*, 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008) the test for a method claim is whether the claimed method is (1) tied to a particular machine or apparatus or (2) transforms a particular article to a different state or thing.

In the instant case, the method claims are not so tied to another statutory class of invention because the **method** steps that are critical to the invention are "not tied to any **particular apparatus or machine**" and therefore do not meet the machine-or-transformation test as set forth in *In re Bilski* 545 F.3d 943, 88 USPQ2d 1385 (Federal Circuit, 2008).

It is noted that for the same reasons as discussed above with respect to the method claims, apparatus claims 15, 17-19, and 24 also fail to recite a practical application of a judicial exception.

It is also noted that claims 20 and 25 recite compute programs, which, per se, are not statutory (i.e. while the claims only recite what embodiments occur WHEN the computer program is on a computer, the instant claims do not REQUIRE that the computer programs reside on tangible medium.) Furthermore, with regards to computer readable media (i.e. claim 21), as the specification is silent as to a definition or exemplary embodiments regarding computer readable media, the term computer readable media is broadly interpreted to encompass carrier waves, which, per se, are not statutory.

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It is also noted that claims 14 and 16 are NOT rejected under this statute because each of these claims recites the physical transformation of exposing subjects to test treatments or test compounds.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-7 and 9-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiiveri et al. [WO 03/034270 A1; published 24 April 2003; filed 17 October 2002] in view of Yang et al. ["A catalog of Noninformative Priors," 1998, accessed online at stats.org.uk on 9 March 2009].

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Claim 1 is drawn to a method for identifying a subset of components of a system based on the data obtained from the system using at least one training sample from the system; the method comprising the steps of:

- obtaining a linear combination of components of the system and weightings of the linear combination of components, the weightings having values based on data obtained from the at least one training sample, the at least one training sample having a known feature;

- obtaining a model of a probability distribution of the known feature, wherein the model is conditional on the linear combination of components;

- obtaining a prior distribution for the weighting of the linear combination of the components, the prior distribution comprising a hyperprior having a high probability density close to zero, the hyper prior being such that it is based on a combined Gaussian distribution and Gamma hyperprior;

- combining the prior distribution and the model to generate a posterior distribution; and

- identifying the subset of components based on a set of weighting that maximize the posterior distribution.

The document of Kiiveri et al. studied a method and apparatus for identifying diagnostic components of a system.

Specifically, claims 1 and 11 of Kiiveri et al. describe all of the limitations of instant claim 1 except the basing of the hyperprior on the Gamma hyperprior.

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The study of Yang et al. is a catalog of priors. One of the priors listed on pages 12-13 of Yang et al. is the Gamma hyperprior.

With regards to claims 2-7, the paragraph bridging pages 4-5 along with the paragraph on page 5 of Kiiveri et al. describes all of the limitations of the instantly rejected claims. Specifically, these paragraphs of Kiiveri et al. discuss utilizing a Bayesian statistical method to estimate weights (claim 2), and the step of making a priori assumptions that a majority of the components are unlikely to be components that will form part of the subset of compounds [see sentences bridging pages 4-5 of Kiiveri et al. – claim 3]. Additionally, Kiiveri et al. states:

The assumption is made that the majority of components are likely to be zero. A model is constructed which, with this assumption in mind, sets the component weights so that the posterior probability of the weights is maximized.

Consequently, this optimization process varies the component weights [claim 4].

The first full paragraph on page 5 of Kiiveri et al. describes potential mathematical relations which comprise likelihood functions providing probability distributions based on the data obtained from the training sample [claims 5-6].

Specifically, Kiiveri et al states:

In one embodiment, the model is a likelihood function based on a model selected from the group consisting of a multimodal or binomial logistic regression, generalized linear model, Cox's proportional hazards model, accelerated failure model, parametric survival model, a chi-squared distribution model or an exponential distribution model.

Consequently, all of the embodiments of instant claim 7 are listed in Kiiveri et al.

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With regards to instant claim 9, claim 13 of Kiiveri et al. teaches the equation of claim 9.

With regards to instant claim 10, claim 16 of Kiiveri et al. teaches the equation of claim 10.

With regards to instant claim 11, claim 17 of Kiiveri et al. teaches the equation of claim 11.

With regards to instant claims 12-13, claims 21-22 of Kiiveri et al. teaches the additional limitations of instant claims 12-13.

With regards to claims 14-17, claim 26 of Kiiveri et al. teach the limitations of method claims 14 and 16. The invention of Kiiveri et al. is directed to a method and APPARATUS [see abstract of Kiiveri et al.] Consequently, corresponding apparatus claims 15 and 17 are obvious over claim 26 of Kiiveri et al.

Claim 18 is drawn to similar subject matter as claim 1, but as an apparatus.

Claim 28 of Kiiveri et al. teaches all of the limitations of instant claim 18, except for the Gamma hyperprior.

As explained above, the study of Yang et al. is a catalog of priors. One of the priors listed on pages 12-13 of Yang et al. is the Gamma hyperprior.

With regards to claim 19, the first sentence on page 20 of Kiiveri et al. teaches the required limitation.

With regards to claims 20-22, claims 30-32 of Kiiveri et al. teach the required limitations.

With regards to claim 23, claim 27 of Kiiveri et al. teaches the required limitation.

With regards to claim 24, claim 33 of Kiiveri et al. teaches the required claim limitation.

Claim 25 is drawn to a computer program which carries out a method of identifying components from a system that are capable of being used to predict a feature of a test sample from a system.

Claim 26 is drawn to similar subject matter, except as a method and not a computer program.

Claims 34 and 35 of Kiiveri et al. teach all of the limitations of claims 25 and 26 respectively, except the **combined** Gaussian distribution and Gamma hyperprior is not taught. (Gaussian distributions are taught in page 44 and claim 11 of Kiiveri et al.)

The study of Yang et al. is a catalog of priors. One of the priors listed on pages 12-13 of Yang et al. is the Gamma hyperprior.

It would have been obvious to someone of ordinary skill in the art at the time of the instant invention to modify the methods of identifying a subset of components of a system of Kiiveri et al. by use of the Gamma hyperprior distributions of Yang et al. because it is "obvious to try" by choosing from a finite number of identified, predictable solutions. In the instant case, the catalog of priors of Yang et al. recognizes a finite number of priors that are applicable to statistical models. One of skill in the art could have pursued any prior in the catalog of Yang et al. with the reasonable expectation of success that each listing of the catalog of Yang et al. is a prior usable in the method and apparatus of Kiiveri et al. In other words, the priors of Yang et al. are equally applicable to the statistical models of Kiiveri et al.; it would have been obvious to try any prior listed in Yang et al. to Kiiveri et al. for this reason.

Conclusion

No claim is allowed.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the central PTO Fax Center. The faxing of such pages must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993)(See 37 CFR § 1.6(d)). The Central PTO Fax Center Number is (571) 273-8300.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Russell Negin, whose telephone number is (571) 272-1083. The examiner can normally be reached on Monday-Friday from 7am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Marjorie Moran, Supervisory Patent Examiner, can be reached at (571) 272-0720.

Information regarding the status of the application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information on the PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/RSN/
Russell S. Negin
9 March 2009

/Marjorie Moran/
Supervisory Patent Examiner, Art Unit 1631